

## QUALITY IN MANUFACTURING – IS A MANAGEMENT TOOL?

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**Summary:** As of today the quality of the company is one of the essential part of the business competitiveness. Business has changed radically since the last major revision of ISO 9001 in 2000, technology has changed how we work, geographical boundaries are almost insignificant in today's global economy, supply chains are increasingly complex and the information available has multiplied exponentially. To be realize a management tool the quality principles have to apply in all of operation and to be successful, businesses have to adapt to meet the growing needs of customers.

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### 1. The evolution of quality systems

As of today the quality of the company is one of the essential part of the business competitiveness. There is a long way taken from F. W. Taylor when he' issued the The principles of Scientific Management in 1911.

The quality takes the necessary evolutionary steps from the quality control to the TQM (Total Quality Management).

The in-between steps known as quality control, quality assurance, quality systems and finally the TQM.

Total quality management can be summarized as a management system for a customer-focused organization that involves all employees in continual improvement. It uses strategy, data, and effective communications to integrate the quality discipline into the culture and activities of the organization.

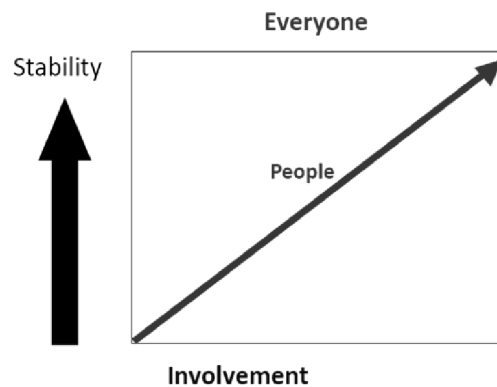
#### *Customer-focused.*

The customer ultimately determines the level of quality. No matter what an organization does to foster quality improvement—training employees, integrating quality into the design process, upgrading computers or software, or buying new measuring tools—the customer determines whether the efforts were worthwhile.

#### *Total employee involvement.*

All employees participate in working toward common goals. Total employee commitment can only be obtained after fear has been driven from the workplace, when empowerment has occurred, and management has provided the proper environment. High-performance work systems integrate continuous improvement efforts with normal business operations. Self-managed work teams are one form of empowerment.

**Figure 1: Relation between Involvement and Stability**



Source: own construction

As more people involved, more problems are solved which create a more stable environment. As the environment becomes more stable, more people can be involved in problem solving.

*Process-centered.*

A fundamental part of TQM is a focus on process thinking. A process is a series of steps that take inputs from suppliers (internal or external) and transforms them into outputs that are delivered to customers (again, either internal or external). The steps required to carry out the process are defined, and performance measures are continuously monitored in order to detect unexpected variation.

*Integrated system.*

Although an organization may consist of many different functional specialties often organized into vertically structured departments, it is the horizontal processes interconnecting these functions that are the focus of TQM.

Micro-processes add up to larger processes, and all processes aggregate into the business processes required for defining and implementing strategy. Everyone must understand the vision, mission, and guiding principles as well as the quality policies, objectives, and critical processes of the organization. Business performance must be monitored and communicated continuously.

*Strategic and systematic approach.*

A critical part of the management of quality is the strategic and systematic approach to achieving an organization's vision, mission, and goals. This process, called strategic planning or strategic management, includes the formulation of a strategic plan that integrates quality as a core component.

*Continual improvement.*

A major thrust of TQM is continual process improvement. Continual improvement drives an organization to be both analytical and creative in finding ways to become more competitive and more effective at meeting stakeholder expectations.

*Fact-based decision making.*

In order to know how well an organization is performing, data on performance measures are necessary. TQM requires that an organization continually collect and analyze data in order to improve decision making accuracy, achieve consensus, and allow prediction based on past history.

*Communications.*

During times of organizational change, as well as part of day-to-day operation, effective communications plays a large part in maintaining morale and in motivating employees at all levels. Communications involve strategies, method, and timeliness.

## 2. The evolution of quality standards

The quality standards are following this evolutionary ladder as well.

If we look the ISO 9001:1994 version, that is cover the classical quality control requirements. The main items of those requirements: heavy documentation, working based on documented procedures, inspection, permanent product quality.

The next step is the issue of the ISO 9001:2000 and 2008 standards. This introduce the quality objectives, customer satisfaction and process management concept.

In front of the door is waiting the new ISO 9001:2015 standards which is focus on the followings: risk management, use the opportunities, skill (competence) management, customer satisfaction.

That is clearly seen the new version would like to be a management standard more than before to eliminate weaknesses of the previous versions such as to focused to much the documented system, weak risk management. The new ISO is focusing the risk management, makes less documentation burden, checks the active participation of the management, skill and competence management, improvement of customer satisfaction.

In the manufacturing environment the quality traditionally mean the inspection especially the Asian origin companies but for the real success the company have to moves to operate really efficient quality management tool, which is affect the competitiveness of the company.

First if all we have to define what is mean of quality:

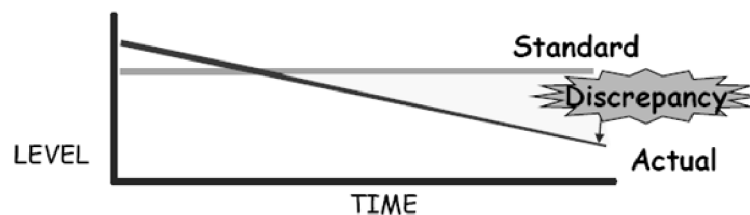
A subjective term for which each person or sector has its own definition. In technical usage, quality can have two meanings:

1. the characteristics of a product or service that bear on its ability to satisfy stated or implied needs;
2. a product or service free of deficiencies.

According to Philip Crosby, it means “conformance to requirements.”

Quality is not only mean the quality of product. Quality means the quality of operations, which is cover the whole area and processes of manufacturing.

**Figure 2: The GAP between current situation and Customer Satisfaction**



Source: by authors

In 1979, Crosby published his first business book, *Quality Is Free*. This book would become popular at the time because of the crisis in North American quality. During the late 1970s and into the 1980s, North American manufacturers were losing market share to Japanese products largely due to the superior quality of the Japanese goods.

Crosby's response to the quality crisis was the principle of "doing it right the first time" (DIRFT). He also included four major principles:

1. The definition of quality is conformance to requirements (requirements meaning both the product and the customer's requirements)
2. The system of quality is prevention
3. The performance standard is zero defects (relative to requirements)
4. The measurement of quality is the price of nonconformance

His belief was that an organization that establishes good quality management principles will see savings returns that more than pay for the cost of the quality system: "quality is free". It is less expensive to do it right the first time than to pay for rework and repairs.

In the electronic manufacturing there is a technological breakthrough in the past decade. The SMT (Surface Mount Technology) are getting standard and able to miniaturize the circuits and provide excellent quality even. The environment protection issues such as the RoHS also impact to the manufacturers especially who used soldering, that have to introduce lead free soldering.

As lead-free and RoHS compliancy fast approaches, it is more important than ever to build it right the first time. Lead-free assembly and RoHS will bring about numerous changes and the number of variables with which to contend is increasing, creating increased risk of defects and reduced product reliability. However, understanding what the variables are and their impact on the assembly can greatly increase product reliability.

Now only the product quality is not enough.

The product quality could be a heavy burden and cost if we're looking the traditional way such as inspection the part in the end. Quality is coming from the process not from the inspection.

As of today due to the automatization and poka-yoke principles everywhere the product quality are achievable.

But what about if we achieve quality targets as a price of cost competitiveness and reduced profit of the operations of the organization.

To be realize a management tool the quality principles have to apply in all of operation.

The changes are fasten now, the quick act to the demand of the markets are very important. But this is shorten the development time, shorten the time of release cause of the challenge is high in the sector, and who is earlier release the product it is win a market, even the product is not a perfect for the first time. Fast response is the key of success. The companies are need to going from reactive to proactive.

Business has changed radically since the last major revision of ISO 9001 in 2000; technology has changed how we work, geographical boundaries are almost insignificant in today's global economy, supply chains are increasingly complex and the information available has multiplied exponentially.

To ensure that ISO 9001 continues to serve the business community and maintain its relevance in today's market place, the standard is being revised to address the change in the business world.

One thing remains constant, to be successful, businesses have to adapt to meet the growing needs of customers.

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